SUMMARY
BIOLOGICAL OPINION FOR REPAIR AND MAINTENANCE OF A 4-WHEEL DRIVE ROAD ON THE LOWER SAN FRANCISCO RIVER

Date of the opinion: April 15, 1997

Action agencies: U.S. Forest Service, Apache-Sitgreaves National Forests (USFS) (lead)
Bureau of Land Management (BLM)

Project: Maintenance and repair of seven low-water crossings on a 4-wheel drive road along the lower San Francisco River upstream from Clifton

Location: Greenlee County, Arizona

Listed species affected: Loach minnow (Tiaroga cobitis) - threatened[1]

American peregrine falcon (Falco peregrinus anatum) - endangered

Biological opinion: Nonjeopardy

Incidental take statement:

Anticipated take: Loach minnow - cannot be quantified. Indexed to fish community and project parameters. Anticipated take is exceeded if: 1) more than 20 dead/dying fish of any species occur at or within 500 yards downstream of project area; 2) equipment is used in wetted channel more than 30 feet upstream or downstream from low water crossings; or 3) any toxic materials spill occurs. Peregrine falcon - no more than 2 adult and 4 young for one year.

Reasonable and prudent measures: Five objectives for minimizing and documenting incidental take. *Implementation of these measures through the terms and conditions is mandatory.*

Terms and conditions: *Terms and conditions implement reasonable and prudent measures and are mandatory requirements.* Terms and conditions include minimization of activities, pollution control, spawning season restrictions, water withdrawal restrictions, minimization of riparian loss, work area restrictions, gravel borrowing terms, monitoring for fish loss, presence of a biologist during project activities, surveys and monitoring for pergrine falcon, and reporting.

Conservation recommendations: *Implementation of conservation recommendations is discretionary.* It is recommended that the ways to reduce or eliminate use of the road be explored for the long-term protection of the river.

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[1]A 1996 10th Circuit Court decision set aside and enjoined from enforcement critical habitat for loach minnow pending compliance with NEPA.

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In Reply Refer To:

AESO/SE
2-21-96-F-233

April 15, 1997

John Bedell
U.S. Forest Service
P.O. Box 640
Springerville, Arizona 85938

Dear Mr. Bedell:

This biological opinion responds to your request of September 20, 1996, for formal consultation pursuant to section 7 of the Endangered Species Act (Act) of 1973, as amended, on proposed repair and maintenance of an unnumbered high-clearance road on the San Francisco River near Clifton, Greenlee County, Arizona. The species of concern in the formal consultation are the threatened loach minnow (Tiaroga cobitis) and the American peregrine falcon (Falco peregrinus anatum). The consultation period began on September 27, 1996, the date your request was received in our office.

It is the Service's biological opinion that implementation of the proposed repair and maintenance of the San Francisco river road is not likely to jeopardize the continued existence of the loach minnow or peregrine falcon.

The August 1996 Biological Assessment and Evaluation (BA) for the proposed project was well written and thorough. In particular, the analysis of indirect and long-term effects was excellent. The photographs of work sites and the completeness and clarity of the project description were very helpful in preparing this biological opinion. The following biological opinion is based on the information provided in the BA, as well as on an April 26, 1996, multi-agency site visit, data in our files, and other sources of information. Literature cited in this biological opinion is not a complete bibliography of all literature available on the species of concern or other subjects considered in this opinion. A complete administrative record of this consultation is on file in the Arizona Ecological Services Office in Phoenix.

INFORMAL CONCURRENCES

The Forest Service determined that the proposed project is "not likely to adversely affect" the endangered razorback sucker (Xyrauchen texanus), Mexican gray wolf (Canis lupus baileyi), southwestern willow flycatcher (Empidonax traillii extimus), and peregrine falcon (Falco peregrinus), and the threatened bald eagle (Haliaeetus leucocephalus), and Mexican spotted owl (Strix occidentalis lucida), and the proposed endangered jaguar (Panthera onca). The Service

concurs with the findings for five of the six species; we do not concur for the peregrine falcon. Because of unsuitable habitat or other factors, it is unlikely that razorback sucker, Mexican gray wolf, southwestern willow flycatcher, jaguar, or Mexican spotted owl are likely to be in the action area. No bald eagle nests occur in the area and the present implementation period would be outside the time in which wintering bald eagles might be present. Project effects are not expected to alter habitat for wintering bald eagles. Therefore, effects to these species are expected to be insignificant and/or discountable due to extremely low level and/or probability.

The Service does not concur with a finding of "is not likely to adversely affect" for peregrine falcon. Because the proposed project would now be conducted during, rather than outside, the peregrine falcon breeding season, the rationale for the "is not likely" finding no longer applies. The cliffs along the San Francisco River within the action area provide potentially suitable nesting habitat for peregrine falcon. Although the nearest known eyrie is over 10 miles away, no surveys have been done in the action area for peregrine falcon using the Arizona Game and Fish Department protocol (Ward, 1994). Therefore, the Service assumes that there are potentially breeding peregrine falcon within the action area. As requested in your September 29, 1996 letter, based on our nonconcurrence we initiated formal consultation on peregrine falcon.

CONSULTATION HISTORY

Informal consultation began in winter 1995/6 with telephone calls between Service and Forest Service biologists and continued throughout the spring and summer, including an April 24, 1996, site visit with Service, Forest Service, Corps of Engineers (COE), Arizona Department of Emergency Management (ADEM), and Greenlee County personnel. Formal consultation was initiated on September 27, 1996. On November 15, 1996, Service, Forest Service, ADEM, and County representatives met at the home of Bill and Barbara Marks on the Blue River to discuss the Blue River road informal consultation. Deliberations on how to expedite that consultation, in light of limited Service staff time and the limited time for use of State emergency funding, led the Service representative to recommend the Forest Service decide which of the two consultations, the Blue River road or the San Francisco River road, was of highest priority to them. The tentative agreement reached during that meeting received my concurrence on November 20, 1996, which was conveyed by telephone to Charlie Denton, Alpine District Ranger, by Sally Stefferud, of my staff, the same day. The agreement was that the San Francisco River road consultation would be extended and the Blue River road consultation shortened to put both consultations on the same timeline for delivery of biological opinions by May 1, 1997, with the actual on-the-ground work to be completed by September 30, 1997. Based on that agreement the ADEM went to the Governor's office and requested extension of the State emergency funding for the two projects (memorandum to the Service from Hugh Fowler, Assistant Director of Disaster Recovery, November 19, 1996).

The Forest Service is lead agency for this consultation and most of the road to be repaired or maintained is on National Forest land. A small portion of the repair and maintenance work is

on Bureau of Land Management (BLM) land and BLM is a joint agency in this consultation. This biological opinion, including the incidental take statement, applies to both agencies, as appropriate under their differing authorities. A small portion of the proposed work (crossing B) is on State of Arizona land and is not covered by this consultation. If a permit from the COE under section 404 of the Clean Water Act is needed for the work on State land, section 7 consultation with COE may be needed to address the effects of the permitted work on listed species.

BIOLOGICAL OPINION

Description of the Proposed Action

The proposed project is to repair and maintain 7 out of 26 low-water ford crossings on an unnumbered high-clearance, 4-wheel drive track along the San Francisco River in Greenlee County, Arizona. The track or road is located along approximately 8.7 miles of the San Francisco River in Township 3S, Range 30E, sections 10, 11, 14, 15, 16, 20, 21, 29, and 32 (Figure 1). The seven crossings which would actually receive work are scattered through the most downstream 5.5 miles of the total 8.7. The purpose of the proposed project is to facilitate access to the privately owned RU Ranch, an inholding within the Apache-Sitgreaves National Forests. The access standard is high clearance 4-wheel drive and does not include increasing current vehicular traffic or facilitating access by any vehicle other than a high-clearance 4-wheel drive.

The proposed work would be limited to the approaches of seven low-water crossings of the San Francisco River. The project is a one-time only event and is anticipated to require approximately one week to complete. The selected crossings are numbered B, 4, 7, 8, 11, 14, and 15 on Figure 1. The only work proposed within the watered portion of the river channel is removal of some large rocks in the crossing. Heavy equipment would also be driven across the first 15 crossings.

Work on the approaches to the crossings -- the ascensions and descensions of the terrace banks -- is needed to allow those areas to be passable without vehicles getting stuck in soft sand. As the ascension and descension points get eroded or sanded in, new tracks are created by road users, thus increasing the amount of disturbance and erosion. The proposed project would help limit the travelway to one main road by improving these problem areas and discouraging creation of additional routes.

The work would be performed by Greenlee County. The County roads supervisor and the Forest Service District biologist would be present during work to ensure adherence to the project process and standards. A two to three step process would be used involving a bulldozer, loader, grader, and dump truck. The process would be as follows:

1. Remove blow sand within the roadway on the ascension and descension points out of the low water channel. The sand would be pushed back onto the bench or terrace with a bulldozer. Past experience by County workers indicates that moist, hardened gravel would underlie the blow sand and the roadway would be uncovered to the level of that gravel.

2. Gravel would be added to the roadway to replace the blow sand and to provide a more hardened surface. The addition of the gravel would avoid the creation of a depression in the roadway which could act as a funnel for water during a high water event. This would reduce the susceptibility of the bench to erosion and may conserve the integrity of the bench by physically adding material to the bench. By promoting limitation of vehicular crossing to one point, the proposed work may reduce or eliminate the creation of secondary roadways and access points onto the benches.

3. Fill material would be obtained from the mouths of nearby drainages entering the San Francisco River. This would reduce direct effects that would otherwise result from dumptrucks driving up and down the river channel to import fill from sites outside the river basin. The dump truck to be used is incapable of traveling through sandy areas under its own power and would require the assistance of a grader or loader to move it. Because of the disturbance this would cause, it is desirable to minimize the use of the dumptruck and obtain fill material from side drainages such as Hackberry and Santa Cruz canyons, located near the work sites. Much of this side drainage material would naturally move into the river during flood events and would be replaced by material moving down the side channel.

4. Travel would be discouraged on multiple, secondary travelways by placing large rocks and boulders with a loader at key access points to exclude vehicles. This would help reduce accelerated deterioration of already eroding benches.

Species Description and Status - Loach Minnow

Loach minnow was listed as a threatened species on October 28, 1986 (USFWS, 1986). Critical habitat was designated for loach minnow on March 8, 1994, including portions of the San Francisco, Tularosa, and upper Gila Rivers, Aravaipa Creek, and the Blue River from Campbell and Dry Blue Creeks downstream to the confluence with the San Francisco River (USFWS, 1994a). Since critical habitat for loach minnow has been enjoined by New Mexico District Court (Coalition of Arizona-New Mexico Counties for Stable Economic Growth versus USFWS, No. 95-1285-M Civil D.N.M., filed March 4, 1997), no conferencing or consultation is required for critical habitat for this species.

Loach minnow is a small, slender, elongate fish with markedly upwardly-directed eyes (Minckley, 1973). Historic range of loach minnow included the basins of the Verde, Salt, San Pedro, San Francisco, and Gila Rivers (Minckley, 1973; Sublette *et al.*, 1990). Competition and predation by non-native fish and habitat destruction have reduced the range of the species by about 85 percent (Miller, 1961; Williams *et al.*, 1985; Marsh *et al.*, 1989). Loach minnow remains in limited portions of the upper Gila, San Francisco, Blue, Black, Tularosa, and White

Rivers; and Aravaipa, Eagle, Campbell Blue, and Dry Blue Creeks in Arizona and New Mexico (Barber and Minckley, 1966; Silvey and Thompson, 1978; Propst *et al.*, 1985; Propst *et al.*, 1988; Marsh *et al.*, 1990; Bagley *et al.*, 1995).

Loach minnow is a bottom-dwelling inhabitant of shallow, swift water over gravel, cobble, and rubble substrates (Rinne, 1989; Propst and Bestgen, 1991). Loach minnow uses the spaces between, and in the lee of, larger substrate for resting and spawning (Propst *et al.*, 1988; Rinne, 1989). It is rare or absent from habitats where fine sediments fill the interstitial spaces (Propst and Bestgen, 1991). Some studies have indicated that the presence of filamentous algae may be an important component of loach minnow habitat (Barber and Minckley, 1966). The life span of loach minnow is about 2 years (Britt, 1982; Propst and Bestgen, 1991). Loach minnow feeds exclusively on aquatic insects (Schreiber, 1978; Abarca, 1987). Spawning occurs in March through May (Britt, 1982; Propst *et al.*, 1988); however, recent reports have confirmed that under certain circumstances loach minnow also spawn in the autumn (Vives and Minckley, 1990). The eggs of loach minnow are attached to the underside of a rock that forms the roof of a small cavity in the substrate on the downstream side. Limited data indicate that the male loach minnow may guard the nest during incubation (Propst *et al.*, 1988; Vives and Minckley, 1990).

Recent biochemical genetic work on loach minnow indicate there are substantial differences in genetic makeup between remnant loach minnow populations. Remnant populations occupy isolated fragments of the Gila basin and are isolated from each other. Based upon her work, Tibbets (1992) recommended that the genetically distinctive units of loach minnow should be managed as separate units to preserve the existing genetic variation.

The status of loach minnow is declining rangewide. Although it is currently listed as threatened, the Service has found that a petition to uplist the species to endangered status is warranted. A reclassification proposal is pending, however work on it is precluded due to work on other higher priority listing actions (USFWS, 1994b). The need for reclassification is not due to data on declines in the species itself, but is based upon increases in serious threats to a large portion of its habitat.

Species Description and Status - Peregrine Falcon

The American peregrine falcon was listed as an endangered species on October 13, 1970 (35 FR 16047). No critical habitat has been designated for this species. The peregrine falcon is a medium-sized raptor with various subspecies distributed worldwide. The American peregrine falcon occurs across much of North America. It nests on cliffs near sources of avian prey. The peregrine falcon has traditionally been strongly associated with cliffs near large bodies of water such as seacoasts, lakes, and large rivers (Ratcliffe, 1980). However, the arid American southwest has recently been demonstrated to support the largest concentration of peregrines known in North America, excluding Alaska. Studies have documented high densities of breeding pairs in the Southwest, particularly the Colorado Plateau Province (Burnham and Enderson, 1987; Hays and Tibbitts, 1989; Tibbitts and Bibles, 1990; Brown, 1991). Local concentrations

of nesting pairs have also been documented in the mountains of southeastern Arizona (Tibbitts and Ward, 1990a and 1990b; Berner and Mannan, 1992; Ward 1993).

In the Southwest, breeding peregrines are currently found almost anywhere large [approximately ≥100 meters (m)] cliffs are available, with the exception of the hottest and driest desert regions (Tibbitts and Ward, 1990a; Ward, 1993; USDI unpubl. data). Large cliffs overlooking chaparral, pinyon-juniper woodland, conifer forest, and riparian habitats apparently provide high-quality habitat. These cliffs are currently occupied by breeding pairs almost wherever they occur in Arizona and southern Utah, even where surface water may be many miles distant. Even in the Sonoran desert, peregrine falcons may be found breeding where perennial surface water and associated riparian prey populations are available. Breeding season for peregrine falcons in the southwest extends from March 1 to late June or early July (Ward and Siemens, 1995).

The American peregrine falcon appears to be making considerable progress toward recovery throughout much of its range. On June 30, 1995, the Service published an advance notice of a proposal to remove the American peregrine falcon from the list of endangered and threatened wildlife, stating that data currently on file with the Service indicate that this subspecies has recovered following restrictions on the use of organochlorine pesticides in the United States and Canada and because of management activities including the reintroduction of captive-bred peregrine falcons (60 FR 34406).

Peregrines feed almost exclusively upon other birds, such as shorebirds, pigeons, doves, robins, flickers, jays, swifts, swallows, and other passerines that opportunity presents (Craig, 1986). Although some individuals may become adept hunters, it is estimated that peregrine succeed in making kills only 10 to 40 percent of the time (Roalkvam, 1985; Cade, 1982). The falcons compensate for this inefficiency by traveling extensively when hunting. During the breeding season, a hunting range of 10 miles may be considered typical (Craig, 1986). Proximity of a cliff to surface water may affect occupancy. In Arizona, nearly all nest sites which are great distances from extensive permanent water have nearby permanent water sources; rivers, lakes, and streams are the most important sources (Ellis, 1982). The presence of rivers, riparian habitat, or other surface water in peregrine nesting habitat may be a feature in determining the presence of an adequate food supply.

The Peregrine Falcon Recovery Plan for the Southwest Population (USFWS, 1984) recommends against land-use practices and development which adversely alters or eliminates the character of hunting habitat or prey base within 10 miles, and the immediate habitats within 1 mile of the nesting cliff.

Environmental Baseline

The environmental baseline includes past and present impacts of all Federal, State, or private actions in the action area, the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation, and the impact of State and private actions which are contemporaneous with the consultation process. The environmental

baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation.

The San Francisco River has undergone substantial modification within the past century and a half. In 1846, the mouth of the San Francisco River was described as having thick borders of flags (*Iris* sp.) and willows with some larger cottonwood and beaver dams in "great numbers" (Emory, 1848). Beaver were abundant along the San Francisco River in the early-1800's and the 1826 Pattie expedition took 250 beaver pelts from the mouth of the river to near the headwaters (Pattie, 1833). By the turn of the century, the beaver had been reduced to a minor element in the system and agriculture, livestock grazing, roads, mining, timber harvest, and other human activities within the watershed had substantially altered the hydrologic and sediment regimes and the river channel (Olmstead, 1919; Leopold, 1946). Extensive harvest of wood of all types for timbers and fuel at the mines at Clifton-Morenci and the fuelwood needs of the local population decimated both the upland and riparian woodlands (Bahre, 1991). In addition to the water diversion, wood harvest, roads, and toxic discharges resulting from the mines in the Clifton area, placer mining was practiced on the San Francisco River above Clifton (Dobyns, 1981). Although the proportional contribution of natural forces and human forces in stream channel erosion in the Southwest has been widely debated, there is substantial evidence that human activities have been a major contributing factor (Duce, 1918; Leopold, 1924a; Leopold, 1924b; Bryan, 1925; Leopold, 1946; Hastings, 1959; Hastings and Turner, 1980; Dobyns, 1981; Bahre, 1991). Large floods in the 1890-1906 period accelerated the erosion of the destabilized system resulting in a river channel similar to that present today.

Today, the lower San Francisco River channel is a wide unvegetated expanse of cobble, gravel, boulder, and sand with a braided and shifting wide, shallow low-flow channel. River terraces or benches are small eroding remnants of former river banks. The unstable nature of the existing channel is illustrated by the frequent changes in road and low-water crossing locations due to changes in the river course. Crossings may change in location up to one-quarter mile or more (see BA). Riparian vegetation is sparse and lacking in structural diversity. It consists primarily of seep willow (Baccharis salicifolia), cottonwood (Populus fremontii) seedlings and saplings, and the nonnative salt cedar (Tamarix pentandra). Sedges (Carex sp.), which are a key element in healthy stable streambanks, are uncommon. On the BLM and State lands, where livestock grazing along the river is authorized, there is virtually no herbaceous cover. A detailed description of the project area is found in the BA.

Present uses of the San Francisco watershed and valley bottom continue to contribute to the deteriorated condition of the river, although at a level reduced from that of the late 1800's. Timber harvest, road, and grazing activities within the watershed continue to contribute erosion, vegetation change, and alteration of the hydrologic regime. Although there is very little private land along the river in Arizona, there are substantial areas of private land on the river in New Mexico. Near the towns of Glenwood, Pleasanton, and Reserve there are farms, ranches, and towns along the river bottom as well as pastures and irrigated agriculture. There are a number of small diversion structures and irrigation canals. The river is completely diverted near Glenwood and Pleasanton during the low flow periods and substantial nutrient loads are added

in irrigation return flows (Propst *et al.*, 1988). Although the lower San Francisco River bottom above Martinez Ranch was closed to vehicle use in 1987, some unauthorized off-road-vehicle use in the river bottom continues to occur upstream from the end of the road. The road itself lies within the floodplain for 8.7 miles. Within that length, there are 26 low-water ford crossings. Forest Service lands along the San Francisco River in Arizona have been excluded from livestock grazing, although occasional trespass use occurs. Livestock grazing in the river continues on BLM and State lands.

The San Francisco River, like all streams remaining in the Gila River basin, has also been subject to introduction of a number of nonnative fish and other aquatic species, although natives still predominate. Nonnative species adversely affect the native fish community through competition and predation (Courtenay and Stauffer, 1984; Marsh *et al.*, 1989; Marsh and Brooks, 1989; Blinn and Runck, 1990; Propst *et al.*, 1992; Carmichael *et al.*, 1993; Douglas *et al.*, 1994). Nonnative species occurring in the San Francisco River include red shiner (Cyprinella lutrensis), channel catfish (Ictalurus punctatus), flathead catfish (Pylodictis olivaris), mosquitofish (Gambusia affinis), carp (Cyprinus carpio), fathead minnow (Pimephales promelas), smallmouth bass (Micropterus dolomeiui), and softshell turtle (Trionyx spiniferus) (Anderson and Turner, 1977; Minckley and Sommerfeld, 1979; J.M.Montgomery Consulting Engineers, 1985; Papoulias *et al.*, 1989; Bagley *et al.*, 1995).
The fish fauna of the lower San Francisco River is depauperate in species and in numbers. In 1904, Chamberlain found no fish of any species during surveys from the mouth of the river up to the Blue River (Chamberlain, 1904). He reports local stories of previously abundant fish and speculates that the loss of those fish is due to flooding, heavy silt loads, mining effluent, and extensive water diversion. In 1979, surveys found the lower San Francisco to support "few individual fishes and little biomass" (Minckley and Sommerfeld, 1979). Numbers of fish collected during the 1994-96 surveys were low, although not alarmingly so (Bagley *et al.*, 1995).

In addition to loach minnow, four other native fishes remain in the lower San Francisco River; the speckled dace (Rhinichthys osculus), longfin dace (Agosia chrysogaster), desert sucker (Catostomus [Pantosteus] clarki), and Sonora sucker (Catostomus insignis). Gila chub (Gila intermedia) is still found in two tributaries to the lower San Francisco, but not in the river itself (Anderson and Turner, 1977; Minckley and Sommerfeld, 1979; J.M.Montgomery Consulting Engineers, 1985; Papoulias *et al.*, 1989; Bagley *et al.*, 1995). Of the four remaining native species, loach minnow is the rarest. Loach minnow have been extirpated from portions of the San Francisco River by human activities, and outside of moderate-sized areas where suitable conditions have prevailed, their occurrence is irregular and fragmented (Propst *et al.*, 1988).

Although the historical records of the San Francisco River fish fauna are few, those records, plus some from the San Francisco River upstream and Gila River downstream, can be used to construct a list of fish species that were most probably historically found in the San Francisco River. This information can be combined with early descriptions of the river and its valley bottom, from which it appears that the river was narrower with more distinct streambanks and riparian cover and that the aquatic habitat was much more varied and complex. Based on this information, eight species of native fish have been extirpated from the San Francisco River in

the past century. Reintroduction of one of those, the razorback sucker, has been attempted with uncertain success. The reason for the extirpation of over 60% of the native San Francisco River fish fauna can only be speculated upon but is presumed to be tied to the substantial human alteration of the aquatic habitats along with the introduction of nonnative species.

The distribution of loach minnow in the San Francisco River in Arizona is not well known. When Chamberlain surveyed the lower San Francisco River in 1904, he found the river barren of fish, although he reported that local people said the river formerly had numerous fish, particularly suckers (Chamberlain, 1904). The first known record of loach minnow in the Arizona portion of the river was in 1977 (Anderson and Turner, 1977), although it had been recorded in the upstream New Mexico portion of the San Francisco River since the 1940's (LaBounty and Minckley, 1972). Since 1977, loach minnow have been found throughout the Arizona portion of the San Francisco River although in low numbers (Anderson and Turner, 1977; Minckley and Sommerfeld, 1979; J.M.Montgomery Consulting Engineers, 1985; Papoulias *et al.*, 1989; Bagley *et al.*, 1995). Within the project and action area, recent surveys at the confluence of the San Francisco River and Hickey Canyon and at the Forest/BLM boundary found loach minnow at both sites (Bagley *et al.*, 1995). The downstream limit of loach minnow distribution is unknown and no surveys have been conducted in the San Francisco River below the Forest/BLM boundary since 1983-84, at which time no loach minnow were found below Hickey Canyon (J.M.Montgomery Consulting Engineers, 1985). There is substantial habitat that appears suitable for loach minnow for several miles below the Forest/BLM boundary. The downstream extension of loach minnow in the San Francisco River probably fluctuates over time depending upon water and sediment levels, flooding, and other factors.

Recovery of the peregrine falcon in the Rocky Mountain/Southwest region appears to be greatest in the Colorado Plateau of southern Utah, southwest Colorado, and northern Arizona, and in adjacent habitats in Arizona, Utah, and Colorado. This region has experienced high total numbers of breeding pairs, high rates of site occupancy and high reproductive success (Burnham and Enderson, 1987; Enderson *et al.*, 1991; Tibbitts and Bibles, 1990; Tibbitts and Ward, 1990a and 1990b; Ward 1993). Based on 1994 surveys, the current Rocky Mountain/Southwest population consists of 559 breeding pairs, surpassing the recovery objective by 376 pairs (FR 60:34406-34409).

Productivity at breeding areas in the Intermontane Province, where the proposed project is located, between 1992 and 1995 had the lowest percent occupancy rate, at 78 percent. However, productivity was relatively high at 1.1 young fledged per occupied site (Garrison and Spencer, 1996).

No active peregrine falcon eyries are known to occur within 10 miles of the project area and no peregrine falcons, breeding or otherwise, have been observed in the project area. The closest known peregrine falcon sighting occurred in early 1994 along the Blue River about 6 air-miles (12 river miles) from the project area (see BA). However, no surveys using established protocols have been conducted in the action area and, therefore, there is a potential that breeding

peregrine falcons may occur in the action area. Although there are many rocky outcrops and cliffs in the project area, most are low and small and not suitable for nesting peregrine falcons. Of the 5.5 miles of river along which the proposed work will occur, it is roughly estimated that only a total of 1 mile of suitable peregrine nesting habitat occurs (B. Csargo, Apache-Sitgreaves Nat. Forests, pers. com., March 31, 1997).

Only one informal concurrence for loach minnow and none for peregrine falcon have been issued by the Service for specific projects on the San Francisco River. That concurrence, of September 16, 1988, was for "beneficial effect" ("is not likely to adversely affect") to loach minnow from Forest Service closure to ORV use of the San Francisco River from Martinez Ranch to the Arizona/New Mexico State line.

A programmatic concurrence with "is not likely to adversely affect" was issued to Region 3 of the Forest Service on May 5, 1995, for the April 7, 1995, *Non Site-specific Biological Assessment for Threatened, Endangered, and Proposed Species on more than one Forest* for livestock grazing permit issuances that were in conformance with the terms of the biological assessment. The concurrence did not require the Forest Service to notify the Service of findings made under the programmatic concurrence. We believe this programmatic concurrence may have been used for allotments within the action area. Although unknown to the Service, any insignificant, discountable, or beneficial effects under the programmatic concurrence contribute to this environmental baseline.

In May 1986 a biological opinion was issued on the Apache-Sitgreaves National Forests Land and Resources Management Plan. That opinion concluded that implementation of the standards and guidelines in the Plan should provide net benefits to the loach minnow. The loach minnow and its critical habitat were only proposed at the time of that opinion. It also concluded that implementation would not jeopardize the survival and recovery of peregrine falcon. In April 1990, a biological opinion was issued on the BLM Safford District Resource Management Plan. The opinion concluded that the Plan would not jeopardize the continued existence of the loach minnow or peregrine falcon and would not adversely modify proposed (at that time) critical habitat for loach minnow.

Direct and Indirect Effects of the Action

Because of the deteriorated state of the San Francisco River, accumulating effects of numerous small impacts are of serious concern. The localized scope and limited time-frame of the proposed action are expected to limit adverse effects on the loach minnow and peregrine falcon. However, the Service believes the long-term future of the native fish and riparian communities of the San Francisco River depends upon improving the status of the aquatic and riparian habitat through removal or amelioration of all impacts, including small, accumulative effects.

The proposed project is well planned to remove or restrict adverse impacts to the two listed species. The Forest Service has worked hard to structure the project to remove or minimize the adverse effects and has coordinated those efforts with the Service in informal consultation.

Peregrine Falcon - Effects to peregrine falcon from the proposed project are related to disturbance of breeding falcons. If peregrine falcon nests are present in the cliffs along the river in the action area, the noise and activity associated with nearby heavy machinery use during the species breeding season may result in falcons abandoning the nest or neglecting the young. Heavy machinery use would include the actual crossing work, the harvesting of gravel on side canyon alluvial fans, and the movement of machinery between crossings.

The degree of disturbance that peregrine falcons can tolerate is generally believed to be a function of the magnitude of the disturbance, the distance from the breeding site, and the falcon's habituation to human activities. Raptors in frequent contact with human activities tend to be less sensitive to additional disturbances than raptors nesting in remote areas. However, exposure to direct human harassment may make raptors more sensitive to disturbances (Newton, 1979). Where prey is abundant, raptors may even occupy areas of high human activity, such as cities and airports (Newton, 1979; Ratcliffe, 1980; White *et al.*, 1988). The timing, frequency, and predictability of the disturbance may also be factors. Raptors become less sensitive to human disturbance as their nesting cycle progresses (Newton, 1979). Generally, peregrine falcons are least tolerant of disturbance during the prelaying through incubation periods. After young are hatched, peregrines exhibit considerably higher levels of tolerance and are unlikely to abandon the nesting attempt (Cade, 1960; Cade and White, 1976; Fyfe and Olendorff, 1976; Eberhardt and Skaggs, 1977; Olsen and Olsen, 1978; Monk, 1980; Roseneau *et al.*, 1981).

Studies have suggested that human activities within breeding and nesting territories could affect raptors by changing home range movements (Anderson *et al.*, 1990) and causing nest abandonment (Postovit and Postovit, 1987; Porter *et al.*, 1973). In areas of steep topographic "screening," Johnson (1988) suggests that human activity within a core area of about 1,300 feet of the nest might impact peregrine breeding efforts. His recommended core area increased to 2,950 feet in areas with no topographic screening. He based these distances on a model using thresholds for flight responses, not on verified impacts on productivity.

Exposure to direct human harassment may make raptors more sensitive to disturbances (Newton, 1979). Construction activities, operation of heavy machinery, and aircraft activity, all with the notable absence of direct human harassment, were generally tolerated by nesting peregrine falcons and gyrfalcons (Platt, 1977; Ellis, 1981; Haugh, 1982; White and Thurow, 1985; Ritchie, 1987; White *et al.*, 1988). Peregrines have nested in situations where there is a high level of disturbance, such as on buildings in urban settings (Cade and Bird, 1990). They have also nested near potential disturbance from low level military jets and sonic booms (Ellis, 1981). Peregrine falcons and golden eagles have been known to nest successfully within a few hundred meters of areas such as airports, blasting, construction, quarrying, and mining sites (Pruett-Jones *et al.*, 1980; Haugh, 1982; White and Thurow, 1985; White *et al.*, 1988). Cade and Bird (1990) discussed the possible effects on peregrines of high levels of human activity, including noise and machinery such as compressors, blowing fans, and bright night lighting. They concluded that the effects were unknown. Apparently, responses vary considerably within and among species.

In the proposed action area, nesting peregrine falcons would not likely be habituated to operation of heavy machinery. There is little "screening" of cliffs from the worksites in the area of the proposed action and the use of heavy machinery would occur within less than one-half mile from the cliffs which may harbor breeding peregrine falcons. However, the proposed action would likely take place toward the end of the breeding season when peregrine falcons may be less likely to abandon the nest when subjected to noise and harassment.

Loach Minnow - Adverse effects to loach minnow are expected to occur through several direct and indirect mechanisms. The most direct of these is the crushing of loach minnow and their eggs by movement of work vehicles on the low-water crossings (both those under maintenance and those used to move machinery up and down the road) and during removal of large boulders from the crossings. Loach minnow are very susceptible to crushing because of their habit of seeking cover under cobble and boulders and maintaining that position in the presence of disturbance. Loach minnow that do not fall under the vehicle wheels are subject to harassment as they flee. This may disrupt feeding, resting, and breeding behavior and may expose those individual loach minnow to greater risks of predation, displacement downstream, and other adverse effects. During flight, juvenile loach minnow in shallow stream edges may become entrained in swifter currents and swept downstream into deeper and colder water where they are vulnerable to predation or thermal shock.

Although some mortalities are likely to result from the proposed project, the project is planned to minimize the use of vehicles and machinery in the river channel thereby minimizing mortalities of loach minnow. According to the BA, only 1 percent of the loach minnow habitat in the action area is within the 15 crossings that would either be repaired or crossed by heavy machinery during the proposed project.

In addition to the direct mortalities, loach minnow would be adversely affected by habitat modification and destruction due to the presence, maintenance, and repair of the road. The adverse effects of roads on streams has been extensively documented. Roads and their construction and maintenance cause sediment input into streams, contribute to bank and channel instability and erosion, remove or reduce riparian vegetation, and compact bank soils and stream substrates (Dobyns, 1981; Brozka, 1982; Meehan, 1991; Young, 1994; Waters, 1995). Many indirect adverse effects are attributable to roads along streams, including increased pollution, increased recreational use, increased suburban development, increasing channelization, increased removal of large woody debris, and many others.

Because the stream provides habitat for the loach minnow, the adverse effects of the road on the river are also adverse effects to the loach minnow. The most direct of these effects would be through deposition of additional fine sediment into the river. This would occur as a result of the disturbance of riverbanks during the maintenance of the ascension and descension points on the seven crossings. Unless the improvements to the road from the proposed action result in increased use of the road, the sediment contributed by the presence and use of the road should stay the same or decrease as a result of the proposed project. Adverse effects of stream sedimentation to fish and fish habitat have been extensively documented (Murphy *et al.*, 1981;

Wood *et al.*, 1990; Newcombe and MacDonald, 1991; Barrett, 1992; Megahan *et al.*, 1992; Waters, 1995; Newcombe and Jensen, 1996). Because of their benthic habit, loach minnow and their eggs are particularly vulnerable to substrate sedimentation which reduces available habitat and smothers eggs (Propst *et al.*, 1988).

Although only 1 percent of the loach minnow habitat is directly within the crossings, most of the crossings are at the head of the riffles and another 23 percent of available loach minnow habitat is in the riffles directly downstream from the crossings. Those riffles would be affected by the presence, use, maintenance, and repair of the road through deposition of sediment. Loach minnow tend to occupy the top and margins of riffles with the lower and center portions of the riffles being occupied by speckled dace (Propst *et al.*, 1988).

Long-term indirect effects also include a number of other factors. The most serious of these is the contribution of the road and its repair and maintenance to creating and maintaining the instability of the river channel. The historic road in the floodplains of the San Francisco River and its tributary Blue River has been implicated as one of the major factors in the erosion and destabilization of the two rivers (Leopold, 1946). Vehicular use of the lower San Francisco River has been noted as a factor in aquatic and riparian habitat alteration and destruction (Anderson and Turner, 1977; Carothers *et al.*, 1982). Vehicular use was considered by the Forest Service to be a serious enough adverse impact to the San Francisco River to support closing the river canyon in 1988 from a short distance above the action area upstream to the Arizona/New Mexico boundary. The proposed project would decrease the contribution of the road to erosion and channel instability through improvement of the bank ascensions and descensions. If improvement of the road increases road use, the decrease in erosion and increase in stability from the proposed project could be outweighed by the adverse effects of heavier road use.

Roads located within the floodplain, such as the one in the proposed project, have particularly deleterious effects on streams because of the lack of buffers between the road and the stream. A healthy riparian zone with substantial herbaceous cover is a very effective buffer for filtering sediment and pollutants from projects before they can reach the stream (Erman *et al.*, 1977; Mahoney and Erman, 1981; Lowrance *et al.*, 1984; Bisson *et al.*, 1992; Osborne and Kovacic, 1993). The riparian vegetation also serves to strengthen the streambanks to make them less susceptible to erosion (U.S. Forest Service, 1977; Thomas *et al.*, 1979; Heede, 1985; Elmore and Beschta, 1988; Stromberg, 1993). On the lower San Francisco River, the riparian vegetation is sparse and mostly lacking in herbaceous cover as a result of over a century of human activities and flood damage. Therefore, the opportunity for riparian buffering of road effects is low. In addition, the road is often inside of the riparian zone and actually within the stream on crossings, thus preventing even the limited buffering capability of riparian vegetation on the lower San Francisco from working.

During the proposed work, the potential exists for introduction of toxic substances, such as petroleum products, into the stream. If this occurs, direct mortality of loach minnow may occur.

Improvement of the road by the proposed action may result in increased use of the road. At present, it is estimated that 12-20 vehicles per day use the road on weekends in summer and 0-5 vehicles per day during the week (see BA). Increased use of the road would increase the mortalities of loach minnow on the crossings, increase the amount of sediment added to the river, increase the development of alternative tracks, increase the potential for erosion of remnant terraces, and increase instability of the river channel.

Increased road use would directly increase adverse effects to peregrine falcon by raising the level of noise and disturbance of nesting peregrines. It would also increase a number of more indirect adverse actions on the loach minnow. As traffic increases at the end of the maintained portion of the road, the likelihood and number of unauthorized intrusions of vehicles into the Blue River and upstream into the portion of the San Francisco River closed to vehicular use is increased. This unauthorized use may be even more destructive of streambanks, river channel, and loach minnow habitat than on the maintained portion due to the potential for multiple routes and vehicles which get stuck and have to be dug or pulled out. It would also extend the area of potential disruption of peregrine falcon breeding.

Increased vehicle use of the maintained portion may result in increased recreational impacts, such as bank compaction and riparian suppression from picnicking and camping. Other uses that may cause adverse impacts to the riparian and terrace vegetation may also increase, such as fuelwood gathering. An increase in vehicular traffic would also increase the probability of introduction of toxic substances, such as petroleum products, into the river.

As noted in the BA, a potential beneficial effect of increased road use would be a greater fishing pressure on catfish, which is an undesirable predator on loach minnow. However, increased fishing use of the river would also increase the likelihood of unauthorized introduction of additional nonnative species. This may be purposeful, as when a fisherman releases new fish species that he or she believes would enhance their fishing experience, or accidental through release of live bait. Such unauthorized releases are a common way in which nonnative species find their way into new streams (Courtenay and Stauffer, 1984).

Cumulative Effects

Cumulative effects are those effects of future non-Federal (State, local government, or private) activities on endangered or threatened species or critical habitat that are reasonably certain to occur during the course of the Federal activity subject to consultation. Future Federal actions are subject to the consultation requirements established in section 7 and, therefore, are not considered cumulative in the proposed action.

The majority of the land in the action area and upstream in the watershed is under the jurisdiction of the Forest Service or BLM and activities affecting the loach minnow or peregrine falcon, such as grazing and timber harvest, would be Federal actions which are subject to section 7 consultation. Recreation in the area is light to moderate and in general has minor impact on the river in the project area and much of it is on Federal lands. Some cumulative effects derive

from the private lands in the valley bottom nearby and upstream from the action area. The nearby private lands are used almost entirely for livestock grazing which is generally managed in conjunction with the grazing on adjacent Federal land.

The private lands upstream from the project area on the Blue and San Francisco rivers have a number of ongoing activities that contribute to the cumulative effects of the proposed project. These activities have been discussed in the Environmental Baseline section of this opinion. Other than slow, minor increases in population and residential development, the Service is unaware of any new State, local government, or private actions that are planned for the reasonably foreseeable future on these private lands.

There are extensive private lands downstream from the project area. The adverse activities that are occurring in those areas have been described in the Environmental Baseline section of this opinion. Because they are downstream from the project, they do not affect the loach minnow within the project area. However, the suppression or elimination of loach minnow from downstream areas of the San Francisco River by ongoing and future private actions contributes to the vulnerability of the loach minnow population of the San Francisco River as a whole.

CONCLUSION

After reviewing the current status of the loach minnow, the environmental baseline for the action area, the direct and indirect effects, and cumulative effects of the proposed maintenance and repair of seven low-water crossings on the road along the lower San Francisco River, it is the Service's biological opinion that implementation of the project, as proposed, is not likely to jeopardize the continued existence of the loach minnow, or peregrine falcon.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act, as amended, prohibits any taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish and wildlife without a special exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered a prohibited taking provided that such taking is in compliance with the incidental take statement. **The measures described below are nondiscretionary, and must be undertaken by the agency or made a binding condition of any grant or permit issued to the applicant, as appropriate.**

The Service anticipates that the proposed maintenance and repair of seven crossings on the lower San Francisco River road may result in incidental take of loach minnow through direct mortality or through indirect mortality due to habitat loss or alteration. Adult or larval loach minnow or

loach minnow eggs present in the work area may be crushed by machinery, poisoned by accidental introduction of toxic substances, or smothered by sediment input. Indirect take may also potentially occur through destruction or alteration of habitat resulting from bank and riparian modification and channel destabilization.

The anticipated level of incidental take of loach minnow cannot be directly quantified due to the low level of data on the loach minnow population in the area and the inability to predict long-term project effects. Because of their small size and benthic habitat and due to the velocity of the river, it is unlikely that loach minnow or eggs killed as a result of the proposed project would be observed. Therefore anticipated levels of take are indexed to the total fish community and habitat. Anticipated take for loach minnow for the proposed action will be considered to have been exceeded if at any time during project activities:

1. more than 20 dead fish of any species are found in the area of the project or within 500 yards downstream,

2. equipment or machinery enters the wetted portion of the river more than 30 feet on either side of the centerline of any of the low-water crossings, or

3. any spill of toxic materials occurs in the Blue River or its floodplain during project implementation.

The Service anticipates that the proposed maintenance and repair of seven crossings on the lower San Francisco River road may result in incidental take of peregrine falcons in the form of harm and harassment due to disruption of normal reproductive behavior. This harm and harassment is in the form of disturbance during project activities.

The Service anticipates that the proposed action could result in incidental take of no more than two adult and four young peregrine falcons for one year due to:

1. temporary reduction or elimination of successful fledgling of young in habitat located within one-half mile of proposed actions, for the 1997 breeding season, and

2. vacancy of existing breeding sites located within one-half mile of proposed actions, for the 1997 breeding season.

If, during the course of the action, the amount or extent of the incidental take anticipated is exceeded, the Forest Service and BLM must reinitiate consultation with the Service immediately to avoid violation of section 9. Operations must be stopped in the interim period between the initiation and completion of the new consultation if it is determined that the impact of the additional taking will cause an irreversible and adverse impact on the species. The Forest Service and BLM should provide an explanation of the causes of the taking.

Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize the incidental taking authorized by this biological opinion. Many of the reasonable and prudent measures and their implementing terms and conditions are already an implicit or explicit part of the proposed project and their inclusion in this incidental take statement is only an affirmation of their importance in minimizing take. Where the proposed project already adequately fulfills the following reasonable and prudent measures and terms and conditions, this incidental take statement does not imply any requirement for additional measures.

1. Conduct all proposed actions in a manner which will minimize direct mortality of loach minnow.

2. Conduct all proposed actions in a manner which will minimize loss and alteration of loach minnow habitat.

3. Monitor the fish community and habitat to document levels of incidental take.

4. Conduct surveys for peregrine falcon, using the Arizona Game and Fish Department protocol, within the project area before or during project implementation.

5. Maintain complete and accurate records of actions which may result in take of peregrine falcon or loach minnow and their habitat.

Terms and Conditions for Implementation

In order to be exempt from the prohibitions of section 9 of the Act, the Forest Service is responsible for compliance with the following terms and conditions, which implement the reasonable and prudent measures described above.

1. The following terms and conditions will implement reasonable and prudent measure 1.

   1.1 All reasonable efforts shall be made to minimize activities within the wetted channel of the San Francisco River.

   1.2 All reasonable efforts shall be made to ensure that no pollutants enter surface waters during action implementation. No toxic chemicals or vehicles shall be stored or deposited within the floodplain during or after construction.

   1.3 No on-site project activities shall occur during loach minnow spawning season from March 1 to June 1 and from September 1 to October 31.

1.4 No amounts of water greater than 5 gallons at one time shall be removed from the San Francisco River during project activities. Although the proposed project does not include pumping water from the river, the Service is aware that during road maintenance and construction activities, water is sometimes needed. If such a need arises during this project, the water should be obtained from sources other than the river or from the river near Clifton, where loach minnow are not known to occur. Removal of water from the river within the project area could cause take of loach minnow that is not covered by this incidental take statement.

2. The following terms and conditions will implement reasonable and prudent measure 2.

2.1 All reasonable efforts shall be made to minimize damage to or loss of riparian vegetation.

2.2 Use of vehicles or heavy equipment within the wetted channel shall be limited to within 30 linear feet upstream and downstream from the centerline of the seven low-water crossings.

2.3 Borrowing of gravel from tributary alluvial fans shall be done in a manner that generally retains the natural contours of the fans.

3. The following terms and conditions will implement reasonable and prudent measure 3.

3.1 At all times when project activities are ongoing in or within 100 yards of the river, all reasonable efforts shall be maintained to monitor for the presence of dead or dying fish in or within 500 yards downstream of the project area. The Service shall be notified immediately by telephone upon detection of more than 20 dead or dying fish of any species.

3.2 A biologist shall be present during project activities to monitor for take and advise and assist crews in application of these terms and conditions.

4. The following terms and conditions will implement reasonable and prudent measure 4.

4.1 The monitoring shall determine, to the maximum extent possible, occupancy and reproductive status of peregrine falcon in the project area using the Arizona *Game and Fish Department Peregrine Falcon Survey Methodology (Ward, 1994).*

5. The following term and condition will implement reasonable and prudent measure 5.

this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.

We appreciate the ongoing efforts of the Clifton Ranger District in conserving the native ecosystem of the San Francisco River. If we can be of further assistance, please contact Sally Stefferud or Bruce Palmer.

Sincerely,

for Sam F. Spiller
Field Supervisor

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (GM:AZ)(AES)
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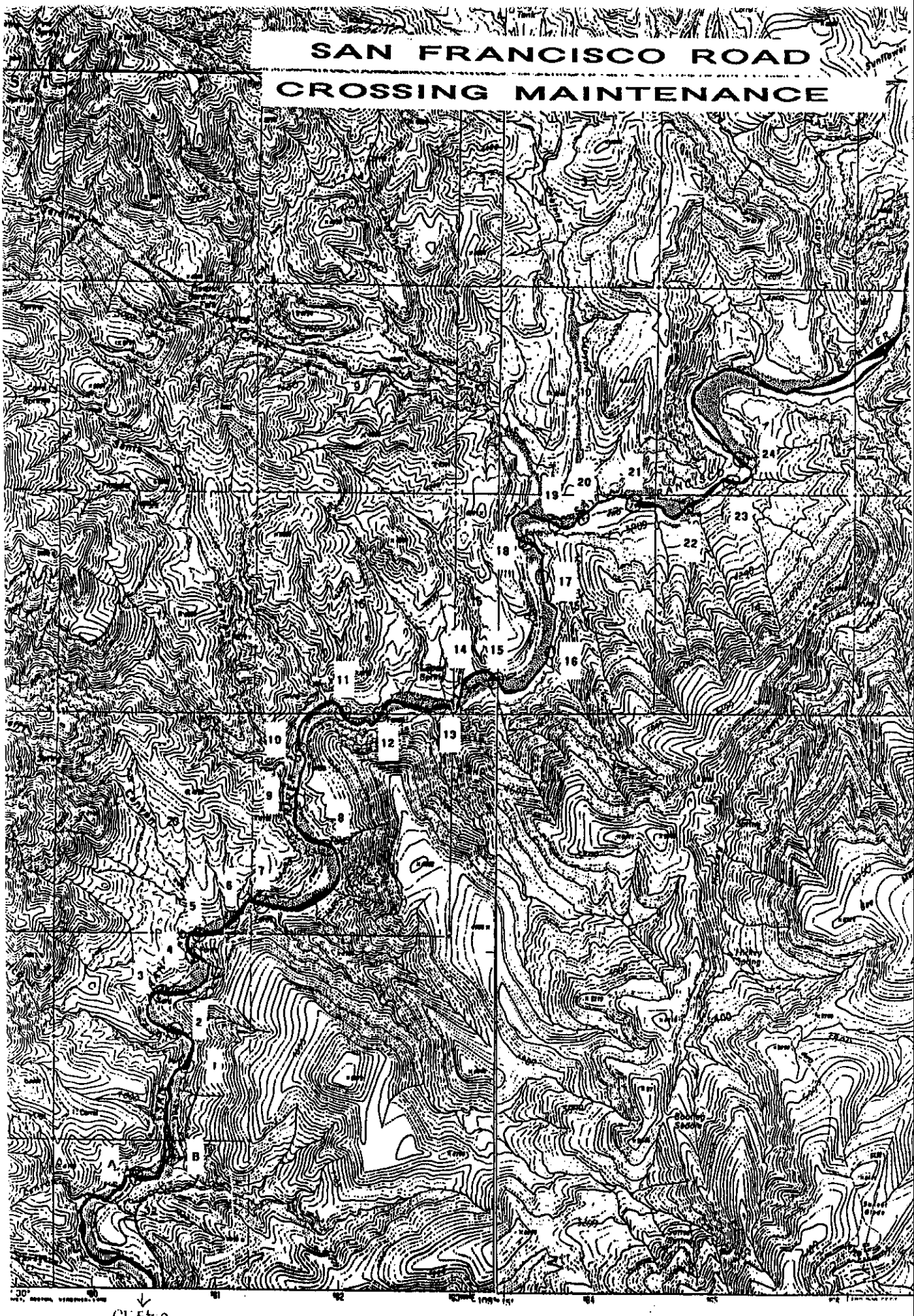
SAN FRANCISCO ROAD
CROSSING MAINTENANCE
Clifton
approx. 6 miles

FIGURE 1